

**ANALYTICAL SERVICES
DIVISION**

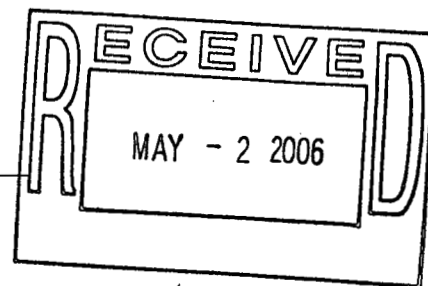
**VERIFICATION AND VALIDATION
GUIDELINES
FOR
ISOTOPIC DETERMINATIONS
BY
ALPHA SPECTROMETRY**

DA-RC01-v2

Effective Date: October 1, 2002

Approved: _____

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Analytical Services



ADMIN RECORD

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V & V GUIDELINE CHANGE DESCRIPTION FORM

Instructions: Replace Version 1 with Version 2

Guideline: DA-RC01	Version: 2	Originator: J.P. Garrett
Description: Verification and Validation. Guidelines for Isotopic Determinations by Alpha Spectrometry		

Section No.	Change Description
Cover Page	New version and Effective date
Introduction	A new introduction was written to incorporate the BOA SOW rather than PSA Modules.
Entire Document	For clarity, change bars appearing on a Section Title indicate significant changes to the entire Section.
Entire Document	Text reworded for clarity, where the original meaning remains unchanged, will not be identified with change bars.
Entire Document	References to the BOA SOW and the RFETS BOA Implementation document GR03 & GR04, are incorporated throughout the document. References to PSA Modules were eliminated. References to Module Specific Verification and Validation (V & V) Guidelines were replaced with Analytical Specific V & V guidelines.
Data Review Checklist	All references to the Data Review Checklist and its examination were removed from the Guidelines.
Entire Document	Removed Reference to Instrument Calibration Package
Entire Document	Replaced 80 KeV with 100 KeV for FWHM
Entire Document	Removed Reference to Peak Centroid Requirement
Section 2.1, Action 1	Changed wording to reflect requirement of acidification to aqueous samples only
Section 2.1, Item 3	Changed holding time to 180 days
Section 2.2	The section for reviewing the Sample Data Package Narrative requirements was updated to the requirements of the BOA.
Section 2.3, Action 1b	An action for missing data was added to this section
Section 2.3, Action 5	Included in action item to reject data if appropriate batch QC samples were not included in re-analysis.
Section 2.3, Items 7 & 8	The entire MDA calculation section addressing non-blank corrected data and blank corrected data was revised.
Section 2.4, Item 1	A check was added to determine if the Batch QC Summary is present and complete.
Section 2.4, Action 2a	An action to issue a NCN for missing QC samples was added. Other actions regarding missing QC were clarified.
Section 2.4, Item 6	Count time requirements for QC samples were added to this item.
Section 2.4, Item 6	Added requirement to report the duplicate relative Error Ratio.
Section 2.4, Item 6	Added requirement to report the relative bias for the LCS.
Section 2.5, Objective	Expanded the objective for this section to include assessment for sample homogeneity.
Section 2.5, Item 4	An evaluation of the BOA criterion for the normalized absolute difference between the sample and laboratory duplicate results was added.
Section 2.6, Objective	Expanded the objective for this section to include assessment of the relative bias for method accuracy.
Section 2.6, Item 2	Deleted reference to LCS percent recoveries and added the assessment of the Relative Bias per the requirements of the BOA.
Section 2.6	Deleted reference to OV/SV requirements for LCS

Section No.	Change Description
Section 2.6, Item 4	Defined what 'appropriate' concentration level for an LCS.
Section 2.7, Item 3	A new section addressing the Blank Population Summary was added.
Section 2.7, Item 4	The assessment of the blank population was rewritten. The requirements of GR03 and the BOA were incorporated. All references to the Winzorized Mean Calculation were removed.
Section 2.8, Item 6	Added statement regarding when the tracer was required to be added to aqueous and solid samples, and added requirement that peak centroid for tracer must be within 50 keV and changed the FWHM resolution requirement for each sample and QC sample tracer peak from , <80 to < 100 keV.
Section 2.8, Item 6	Added requirement for re-analysis of samples of tracer recoveries are not met
	Removed tracer recovery requirement for Am/Pu of 20-110% changed to 30-110%
Section 2.10	The Instrument Calibration Summary Section was rewritten to reflect the requirements of GR03, Section 6, "Calibration Raw Data".
Section 2.10, Items 3, 4, & 5	Added frequency requirements for all calibrations(energy, background, and efficiency)
Section 2.10, Item 8	Changed energy calibration requirement for the equation slope to meet 15 keV/channel instead of 13 keV/channel
Section 2.10, Item 8	Changed energy calibration requirement requiring two isotopes in the energy range of 3-6 keV to be used in the calibration to three isotopes being required
Section 2.10, Item 10	Added to efficiency control limits that the isotopes used in the calibration must have at least 10,000 net counts in the ROI
Section 2.11, Item 5	The FWHM resolution for each sample and QC sample tracer peak was changed from < 80 to <100 keV and the tracer peak centroid was changed from ± 40 keV to ± 50 keV.
Attachment 1	The format for the Data Quality Assessment Report was revised.

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1. INTRODUCTION/SCOPE

This document presents those data assessment steps which are unique to Isotopic Determinations by Alpha Spectrometry. This Analytical Specific document is to be used in conjunction with DA-GR01, "General Guidelines for data Verification and Validation.

The purpose of this document is to provide guidance in the completion of Data Verification, and Data Validation activities as part of the Rocky Flats Environmental Technology Site (RFETS) Analytical Services Division Data Assessment Process as described in DA-GR01.

This version of DA-RC01 is applicable to Isotopic Determinations by Alpha Spectrometry Sample Data Packages generated under the National Basic Ordering Agreement (BOA) Statement of Work (SOW) and the Rocky Flats Environmental Technology Site (Site) BOA Implementation Requirements documents, GR03 & GR04.

2. VERIFICATION AND VALIDATION INSTRUCTIONS

The instructions contained in this section are specific to Isotopic Determinations by Alpha Spectrometry. They are to be used in conjunction with the general instructions for Verification and Validation found in Analytical Services Division's General Guidelines for Verification and Validation, DA-GR01.

2.1. Chain of Custody, Holding Times, and Sample Preservation

Review Items: Sample & QC Result Summary, COC record, and sample preparation raw data.

Objective: To ascertain the validity of results based on the method required: holding times, sample preservation, and the continuity of sample custody.

Source: GR03 § 6, BOA Attachment 1, § 3.1.2; Attachment J to BOA Attachment 1, § 1.2

Evaluation: *The following items apply to both verification and validation:*

Item 1: Check for documentation that the pH of aqueous samples were adjusted to ≤ 2 prior to receipt by the laboratory.

Action 1: If aqueous samples were not acid-preserved prior to receipt by the laboratory, comment and assign the reason code [703] to all applicable samples.

Item 2: Check for documentation showing aqueous samples were adjusted to a pH of ≤ 2 by the laboratory if samples were not adjusted to the proper pH prior to receipt by the laboratory.

Action 2: If an aqueous sample was not adjusted to the proper pH by the laboratory, when appropriate, initiate a Non-Compliance Notification (NCN) and estimated [J 201] all applicable results.

- Item 3:** Verify the maximum hold time of 180 days was not exceeded.
- Action 3:** If samples were not analyzed within the 180 day hold time, do not qualify the data, comment and assign the reason code [101] to all applicable samples.

2.2. Sample Data Package Narrative Requirements

Review Items: Sample Case Narrative

Objective: Review the narrative for compliance to requirements, problems or unusual circumstances encountered in the analytical processing of samples and for information useful to data assessment.

Source: GR03 § 3.2, BOA Attachment 1, § 3.1.6.2

Evaluation: *The following items apply to both verification and validation:*

Item 1: Check that the SDP Narrative is present and includes the following as applicable:

- Procedures and/or Standard Method reference for preparation and analysis.
- Descriptions of significant technical difficulties encountered in preparing and analyzing the samples.
- Justification of all dilutions.
- Explanations of any QC deficiencies, missed holding times, or inability to achieve the required detection limits (RDLs).
- Reasons for reanalysis, reanalysis Analytical Batch Identifications Numbers, and a synopsis of the reanalysis Analytical Batch QC Assessment.
- Explanations and descriptions of all deviations from routine protocols, including deviations from approved standard operating procedures (SOPs), detection limit modifications, etc. If it was necessary to contact the CTR for instructions due to the nature of the deviation, the laboratory shall document those instructions in the narrative.

Action 1: If any of the above items are non-compliant, do not qualify the results, comment and include the reason codes [227] and/or [805] as appropriate. Use professional judgement to determine if the issuance of a NCN is warranted.

2.3. Sample & QC Results Summary

Review Items: Sample and QC Results Summary

Objective: Review the Samples section of Samples and QC Sample Results Summary for compliance to requirements and for information useful to data assessment.

Sources: Attachment J to BOA Attachment 1; GR03, § 6

Evaluation: *The following items apply to both verification and validation:*

Item 1: Verify all samples and tests that were requested on the COC for isotopic determinations have been analyzed, tested and appear on the Sample and QC Result Summary.

Action 1a: If sample were not analyzed, and documentation identifies a valid reason, do not qualify data. Address the deficiency as a comment in the Data Quality Assessment Report.

Action 1b: If the Sample and QC Result Summary is missing or incomplete, issue a NCN, comment and assign reason code [801] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Item 2 Verify the Sample and QC Results Summary contains the following information for Site Samples and laboratory QC samples as applicable:

- LABORATORY NAME
- REPORT IDENTIFICATION NUMBER (RIN)
- RFETS SAMPLE ID
- LAB SAMPLE ID
- ANALYTE
- SAMPLE MATRIX
- RESULTS and UNITS
- 2S(total propagated uncertainty)
- TRACER RECOVERY
- MDA
- ALIQUOT SIZE ANALYZED
- ANALYTICAL BATCH ID

Action 2a: Omissions or errors that do not have an impact on the assessor's ability to assess the data shall be documented with a comment and assigned the reason code [804]. An NCN shall be issued to prevent the recurrence of such errors or omissions in future data packages.

Action 2b: For other omissions or errors that impact the assessor's ability to complete the data review, issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Item 3: Verify only one result is reported for each requested analyte.

Action 3: If more than one result is reported and neither is identified as "Do Not Use data", issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received..

- Item 4:** Verify the MDA for each sample is reported and is \leq the RDL.
- Action 4a:** If the MDA is $>$ the RDL, and a reduced aliquot size was used due to high or significant activity, or insufficient sample volume provided, do not qualify the data.
- Action 4b:** If the MDA exceeds the RDL for reasons other than those identified in Action 4a, estimate [UJ 136] all applicable data.
- Action 4c:** If the MDA is $>$ the RDL and the deficiency is not reported in the narrative, comment and assign reason code [805] to all applicable data.

Evaluation: *The following items applies to validation only:*

- Item 5:** Verify samples requiring reanalysis have been assigned a new analytical batch identification number and appropriate QA/QC is included.
- Action 5:** If data can not be produced to show the batch ID is different and that the appropriate batch QA/QC was included in the reanalysis, reject [R 205] all applicable data.
- Item 6:** If the MDA is $>$ the RDL and the samples and duplicates were prepared with a reduced aliquot size due to high or significant activity, verify that the following criteria were met:
- The net counts per second (CPS) for the analyte ROI are $>$ 100 times the background (same units same ROI).
 - Tracer chemical recoveries are within the acceptable limits.
 - The Continuing Calibration Checks for the respective spectra are within the acceptable limits.
- Action 6:** If any of these items are non-compliant, and the MDA $>$ RDL due to laboratory error, use professional judgment to determine the affect of the non compliance on the data. At a minimum, estimate [UJ 136] all applicable data.

MDA Calculation (No Blank Correction)

The following equation shall be used to calculate the MDA when blank subtraction is not needed. Except as specified above, the analyte MDAs shall be less than or equal to the respective RDL and the Laboratory shall optimize the below-listed factors.

- Item 7:** Calculate at least one sample MDA using the following equation:

$$MDA = \frac{4.65 * \sqrt{\frac{b}{T}}}{K} + \frac{3}{K * T}$$

where,

b = background count rate in cpm

T = count time in minutes

K = efficiency * $e^{-\lambda t}$ * aliquot fraction * tracer recovery*ABN

Efficiency = detector efficiency

t = time from sample collection to mid-point of count time (or nuclide separation time, as applicable) in the same units as half-life

λ = Analyte decay constant = $\ln 2 / (\text{half-life})$

ABN = abundance

Note 1: Use of the above equation requires that the background and sample count times are either equivalent, or the background count time is greater than the sample count time. When sample and background counts are different, this must be included in the equation.

Note 2: The above equation for MDA has the units of dpm/sample. Any other units will require specification by Site/Project.

Action 7: If MDAs have been calculated wrong, whether the parameters have been entered wrong or there has been a calculation error, issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

MDA Calculation (Blank Correction)

Matrices that require blank correction from a blank population include Surface Water, Effluent Air Filters, and Ambient Air Filters. The mean blank value of the 20 latest batch blanks (current blank population) which shall include the batch blank from the data being processed shall be subtracted from each result.

Item 8: Calculate at least one sample MDA using the following equation:

Reference: Curie's equations for MDA as described in ANSI N 13.30, page 27, Section 4.3.1.2 Calculation of Minimum Detectable Amount (MDA) or (MDC) for Indirect Radiobioassay:

S_{bo} = the standard deviation of a matrix blank population

S_{bl} = the standard deviation of a sample where the sample contains no actual analyte activity above the matrix blank

$S_{bl} = [S_{bo}(\text{cpm})] / (E \cdot R)$ for this specific implementation where E is the detector efficiency for the sample for which the MDA is being calculated and R is the tracer recovery for the sample for which the MDA is being calculated.

The complete formula is as follows:

$$MDA = \frac{1}{VF} \times \left[3.29 \sqrt{\left\{ \frac{S_b(\text{cpm})}{ER} \right\}^2 + S_b(\text{dpm})^2} + \frac{3}{ERT} \right]$$

where

VF = volume fraction (i.e. =0.5 for ½ aliquot of the sample, etc.)
For Surface Waters VF is simply the volume analyzed in liters

Sb(cpm) = standard deviation of the matrix blank population in counts per minute

E = detector counting efficiency where the sample for which the MDA is calculated was counted

R = tracer recovery of the sample for which the MDA is being calculated

Sb(dpm) = standard deviation of blank population in disintegrations per minute

T = count time

Note 1: The above equation (using the true volume fraction analyzed and not liters) gives results in units of dpm/sample – the correct units for air filters.

Note 2: For MDA for surface water in units of pCi/l: as described previously, VF is the volume analyzed in liters. The resulting dpm/l is divided by 2.22 to obtain units of pCi/l.

Action 8:

If MDAs have been calculated wrong, whether the parameters have been entered wrong or there has been a calculation error, issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

2.4. Batch QC

Review Item: Sample and QC Results Summary, Batch QC Summary, and Raw Data

Objective: Review the QC Sample Results Summary and the Batch QC Summary for compliance to requirements and for information useful to data assessment.

Sources: Attachment J to BOA Attachment 1; GR03, § 6

Evaluation: *The following items apply to both validation and verification:*

Item 1: Check that the Batch QC Summary is present and complete. The following information shall be included:

- LAB SAMPLE ID
- COUNT DATE
- QC OBSERVED VALUE with associated two sigma uncertainty
- TRACER RECOVERY
- LCS: Know value and relative Bias
- BATCH BLANK: RDL and MDA

- **DUPLICATE:** For each duplicate pair, the result of the duplicate equivalency test as defined in *BOA Attachment J, Section 2.3.3*
- Action 1:** If the Batch QC Summary is not present or is missing information required for data assessment, issue a NCN, comment and assign reason code [801] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.
- Item 2:** Verify a Laboratory Control Sample (LCS), Laboratory Duplicate, and Preparation Blank were included for each analytical batch.
 - Action 2a:** If any of these QC samples are missing, issue a NCN, comment and assign reason code [801] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.
 - Action 2b:** If any single QC sample is missing and data cannot be obtained from the laboratory, qualify applicable data as follows:
 - If missing Duplicate only, estimate [J 128] all applicable data.
 - If missing LCS only, reject [R 174] all applicable data.
 - If missing Preparation Blank only, reject [R 175] all applicable data.
 - Action 2c:** If more than one QC sample is missing and data cannot be obtained from the laboratory, qualify as rejected [R 230] all applicable data.
- Item 3:** Determine if the QC frequency is met by verifying that each analytical batch contains no more than 20 customer samples per set of QC samples (LCS, Laboratory Duplicate, and Preparation Blank).
 - Action 3:** If this item is non-compliant, qualify as estimated [J 168] all applicable data.
- Item 4:** Verify all QC deficiencies are detailed in the narrative.
 - Action 4:** If this item is non-compliant, do not qualify any data. Comment and assign the reason code [805] to all applicable data.
- Item 5:** Verify all sample results, including reanalysis, and the corresponding Analytical Batch QC sample results were reported.
 - Action 5a:** If this item is non-compliant, address the deficiency in the Data Assessment Report using professional judgment to qualify the data. Omissions or errors that do not have an impact on the assessor's ability to assess the data shall be documented with a comment and assigned the reason code [804]. An NCN shall be issued to prevent the recurrence of such errors or omissions in future data packages.
 - Action 5b:** For other omissions or errors that impact the assessor's ability to complete the data review, issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Evaluation: *The following items apply to validation only:*

- Item 6:** Verify each QC sample type is clearly identified, i.e., a designator clearly identifies a QC sample as being a LCS, Batch Blank, or Duplicate, and the following criteria are met:
- The QC samples are counted for a sufficient time to meet the required detection limit except in the case where the achieved MDA is calculated from the standard deviation of a blank population in which case the batch blank will be counted for the same count time as the samples.
 - For each batch duplicate pair, the following additional information is reported:
 - ◊ result of duplicate result equivalency test as defined in Section 2.5, including calculated values for relative Error Ratio.
 - For the "LCS", the following additional information is reported:
 - ◊ LCS "SV" (standard value (SV) of the LCS, decayed to analysis date, if applicable)
 - ◊ Uncertainty of LCS standard value (2-sigma)
 - ◊ LCS Relative Bias

Action 6a: Omissions or errors that do not have an impact on the assessor's ability to assess the data shall be documented with a comment and assigned the reason code [804]. An NCN shall be issued to prevent the recurrence of such errors or omissions in future data packages.

Action 6b: For other omissions or errors that impact the assessor's ability to complete the data review, issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

2.5. Duplicate Samples

Review Item: Sample and QC Results Summary, Batch QC Summary, and Raw Data

Objective: To determine a measure of laboratory precision, or degree of agreement of repeated measurements within acceptable concentration ranges and to assess the homogeneity of the samples.

Sources: Attachment J to BOA Attachment 1; GR03, § 6

Evaluation: *The following items apply to both verification and validation:*

- Item 1:** Verify the results for the duplicate are reported separately from the corresponding sample.

Action 1a: If this item is non-compliant, issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Action 1b: If the laboratory is unable to supply the missing data or errors cannot be corrected, do not qualify any data, comment and assign the reason code [205] to all applicable data.

Item 2: Verify the MDA for each duplicate is reported and is < the RDL

Action 2a: If this item is non-compliant, and the MDA > RDL due to laboratory error, estimate [UJ 136] all applicable data.

Action 2b: If the MDA for a reported duplicate is > the RDL and the following criteria are not met, comment and assign reason code [804] to all applicable data.

- The samples and duplicates were prepared with a reduced aliquot size due to high or significant activity.
- The net counts per second for the analyte ROI are ≤100 times the background (same units, same ROI), and the tracer chemical recovery and Continuing Calibration Checks for the respective spectra are within the acceptable limits

Item 3: Verify that the reported duplicate equivalency test is ≤ 3.

Action 3a: If a duplicates exceed the equivalency test requirement of ≤ 3 due to the difficulty of subsampling and this explanation is described in the Case Narrative, no action is taken.

Action 3b: If the duplicate equivalency test does not pass and the sample is homogeneous, estimate [J 235] all applicable data in the analytical batch.

Evaluation: *The following item applies to validation only:*

Item 4: Calculate the normalized absolute difference between the sample and laboratory duplicate results using the following equation and confirm the value reported:

$$\frac{S - D}{\sqrt{(TPU_S)^2 + (TPU_D)^2}} \leq 3^*$$

where:

S = Sample result

D = Duplicate result

TPU_S = 1s Total Propagated Uncertainty of the sample

TPU_D = 1s Total Propagated Uncertainty of the duplicate

(* 2.58 was rounded to 3)

Action 4: If the duplicate equivalency test was calculated wrong, issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

2.6. Laboratory Control Sample Analysis

Review Item: Sample and QC Results Summary, Batch QC Summary, and Raw Data

Objective: To determine the overall performance of each step during sample preparation and analysis, and to evaluate the LCS relative bias as a means of assessing the accuracy of the analytical method.

Sources: Attachment J to BOA Attachment 1; GR03, § 6

Evaluation: *The following items apply to both verification and validation:*

Item 1: Verify that the LCS met the same tracer recovery requirement as the samples.

Action 1: If the laboratory control sample does not meet the required tracer recovery requirements, reject [R 242] all applicable data.

Evaluation: *The following items applies to validation only:*

Item 2: Verify, by calculation, the LCS relative bias results fall within the range of -.25 to +.25 (Reference: ANSI N13.30, Appendix B) by using the following equation:

$$\text{Relative bias} = \frac{\text{observed} - \text{known}}{\text{known}}$$

Action 2: If the laboratory control sample does not pass the relative bias criteria, professional judgment should be used to determine the effect this has on the data. At a minimum, estimate [J 236] all applicable data.

Item 3: Verify that the following requirements have been met.

- Check that the LCS is of the same analyte as the sample analyte and is at least 5 times the RDL but not greater than 20 times the RDL for the samples in the Analytical Batch with the following exceptions:
 - ◊ The activity of the LCS aliquot for near background level samples for Pu and Am should not exceed 5 dpm, and for U, it did not exceed 10 dpm for each isotope.
 - ◊ For RDLs of low activity the analyte shall be at a level where the random counting error does not exceed 10% in the counting time required to attain the RDL.
- The LCS was spiked with an approved tracer at the same appropriate level as the samples in the Analytical Batch.
- The LCS was prepared and analyzed in the same manner as the samples.
- The LCS was counted for the same count duration as the samples.

Action 3: If the laboratory control sample does meet all criteria, estimate [J 234] all applicable data.

2.7. Preparation Blank

Review Item: Sample and QC Results Summary, Batch QC Summary, and Raw Data

Objective: To assess the extent of contamination introduced through sample preparation, tracer addition, and analysis.

Sources: Attachment J to BOA Attachment 1; GR03, § 6

Evaluation: *The following items apply to both verification and validation:*

Item 1: Verify that the batch blank meets the following requirements:

- **Surface Water:** The batch blank is prepared from ASTM Type II water and is of the same volume as the samples.
Effluent Air Filter: Each blank consist of 10 individual filters composited into one sample.
Ambient Air Filters: One Site furnished 8 x 10 fiber glass filters per batch blank or one oil impregnated impactor pad per batch blank.
- Batch blanks met the same tracer chemical recovery and Continuing Calibration Check requirements as the samples.

Action 1: If these items are non-compliant, do not qualify any data. Comment and assign the reason code [234] to all applicable data.

Item 2: If the MDAs for the samples in an Analytical Batch met the analyte RDL, verify that the activity of the preparation blank is less than or equal to the RDL

Action 2: If the preparation blank activity is not \leq the RDL, estimate [UJ 136] all applicable data.

Preparation Blank Corrections

Surface water, Effluent air filters and Ambient air filter programs require blank correction of data base on the mean blank value of the 20 latest batch blanks (current blank population) . Blank populations are to be implemented to the requirements described in Attachment J to BOA Attachment 1, Section 2.6.3 and GR03 Section 6.. The blank populations are utilized to correct sample results and in the calculation of MDAs.

Item 3: Verify that the Blank Population Summary is included and contains the following information:

- BLANK SAMPLE NUMBER
- DATE OF ANALYSIS(for each blank in the population)
- DPM OF TRACER USED IN THE BLANK
- BLANK RESULT IN CPM (for each blank in the blank population)
- TRACER RECOVERY (for each blank in the blank population)
- DETECTOR EFFICIENCY(for each blank in the blank population)
- BLANK RESULT in dpm(for each blank in the blank population)

- STANDARD DEVIATION OF BLANK POPULATION (in dpm)
- STANDARD DEVIATION OF BLANK POPULATION (in cpm)
- MEAN BLANK VALUE OF THE BLANK POPULATION (in dpm)

Action 3a: Omissions or errors that do not have an impact on the assessor's ability to assess the data shall be documented with a comment and assigned the reason code [804]. An NCN shall be issued to prevent the recurrence of such errors or omissions in future data packages.

Action 3b: For other omissions or errors that impact the assessor's ability to complete the data review, issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Item 4: Verify that a blank correction for Pu-238, Pu-239/240, Am-241, U-234, U-235 and U-238 was performed by establishing a matrix specific (surface water, effluent air filters, ambient fiberglass filters, and ambient impactor pads) blank population for each isotope that meets the following criteria.

- The matrix blank population consist of the 20 most recent batch Blanks with the oldest blank being deleted when the latest is added.
- All failed blanks that are removed from the blank population must meet at least one of the following criteria for removal:
 - ◊ Blank tracer recover is outside the 30% - 110% range
 - ◊ The MDA of the batch blank is greater than the RDL
 - ◊ If all samples in a batch are greater than the RDL and the batch blank is greater than the least active sample in that batch
 - ◊ If all samples in the batch are less than the RDL and the activity of the batch blank is greater than the MDA (See Note 1 for how this criterion is applied to effluent and ambient air filters that contain uranium in the blank filter matrix).
 - ◊ The removal of the batch blank is described in the Case Narrative.

Note 1: If a effluent or ambient air filter that contains uranium in the blank filter matrix, the filter may be removed from the blank population as a failed blank if the activity of the batch blank is greater than the mean blank value of the blank population plus twice the associated standard deviation.

Action 4a: If the blank population was established and not included in the data package issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Action 4b: If a preparation blank population has not been established or does not meet the above requirements, issue a NCN to prevent recurrence and estimate [NJ 238] all applicable data.

Evaluation: *The following items apply to validation only?*

- Item 5:** Verify that the preparation blank meets the following requirements:
- The Preparation Blank MDA calculation was based on the greatest sample volume or weight for the entire Analytical Batch.
 - Preparation blanks were spiked at the same appropriate level as the samples with an approved tracer.
 - Preparation blanks were counted for at least the same count duration as the samples.

Action 5: If these items are non-compliant, do not qualify any data. Comment and assign the reason code [234]

- Item 6:** For analysis that do not require a blank population, verify that the activity for the samples and QC samples have **not** been blank corrected.

Action 6: If the samples and/or the QC samples have been blank corrected, issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

2.8. **Sample Preparation Raw Data**

Review Items: Preparation Raw Data

Objective: To determine if bench sheets and run logs have been filled out properly and if the proper sample preparation methods were performed.

Sources: Attachment J to BOA Attachment 1, GR03, § 6

Evaluation: *The following items apply to verification and validation:*

- Item 1:** Verify that benchsheets and/or preparation logs are included in the SDP.

Action 1: If benchsheets and/or preparation logs are not included, issue a NCN, comment and assign reason code [801] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Evaluation: *The following items apply to validation only:*

- Item 2:** Verify that benchsheets and/or preparation logs are included and document the required items as follows:
- ANALYTICAL BATCH IDENTIFIER
 - DATE OF PREPARATION
 - IDENTIFIER FOR THE LABORATORY SOP for the preparation
 - IDENTIFIERS FOR ALL SAMPLE AND QC SAMPLES in the batch
 - IDENTIFIERS THAT PROVIDE FOR TRACEABILITY of tracer, LCS, dilutions used, etc.

- CONCENTRATION OF WORKING STANDARDS used for tracer, LCS, matrix spike, etc.
- VOLUMES OR WEIGHTS OF ADDED TRACERS, LCS ANALYTE(S), MATRIX SPIKE(S), CARRIERS, etc. (if the concentration is given in activity per unit weight then the weight added shall be reported; if the concentration is given in activity per unit volume, then the volume added shall be reported)
- BALANCE IDENTIFIERS WITH DATES OF USE(if applicable)
- INITIAL AND FINAL WEIGHTS AND VOLUMES for all samples and QC samples including gross weights, tare weights, and aliquot weights where applicable
- PIPETTE IDENTIFIERS AND DATES OF USE (if applicable)
- COMMENTS describing any significant sample changes or reactions which occur during preparation
- SIGNATURES AND DATES of all analysts and reviewers

Soils, Sediments, Sludges and Solid Waste

- APPROXIMATE SAMPLE VOLUME RECEIVED, THE ALIQUOT SIZE HOMOGENIZED

Air Filters

- NUMBER OF AIR FILTERS analyzed in a composite

Action 2a: Omissions or errors that do not have an impact on the assessor's ability to assess the data shall be documented with a comment and assigned the reason code [804]. An NCN shall be issued to prevent the recurrence of such errors or omissions in future data packages.

Action 2b: For other omissions or errors that impact the assessor's ability to complete the data review, issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Item 3: For soils, sediments, sludges and waste (which require homogenizing the sample prior to analysis), verify that the following additional information is reported:

- the approximate sample volume of the gross sample (as received)
- the aliquot size homogenized
- the aliquot size of dried, homogenized sample digested
- the ratio of sample weight as received (wet)/sample weight dried

Action 3: If any of these items are non-compliant, do not qualify any data. Comment and assign the reason code [240] to all applicable data.

Item 4: Verify that a copy of the electroplating or microprecipitation preparation log for each sample and QC sample is included in this Deliverable Section and includes the following information:

- date of preparation
- sample/QC sample ID
- planchet or filter paper ID (if different from sample ID)

- electroplating cell ID (if applicable)
- methodology SOP
- analyst and reviewer's signature and date

Action 4: If any of these items are non-compliant, issue a Non-Compliance Notification to request the missing information. Do not qualify any data. Comment and assign the reason code [241] to all applicable data.

Item 5: Verify that the volume or weight used to calculate the Preparation Blank activity and MDA (pCi/g or pCi/l) did not exceed the maximum volume or weight of sample for the entire Analytical Batch.

Action 5: If this item is non-compliant, do not qualify any data. Comment and assign the reason code [234] to all applicable data.

Item 6: Verify that the analysis of plutonium, uranium, americium, and thorium, for the internal tracer addition methods, are acceptable according to the following:

- Tracer solutions were prepared so that the overall propagated uncertainty at the 2-sigma confidence level did not increase by more than 3% over the uncertainty of the primary SRM.
- The FWHM resolution for each sample and QC sample tracer peak are < 100 keV.
- The tracer peak centroid is ± 50 keV of the known peak energy
- The tracer shall be added to the sample at the very beginning of the sample preparation procedure. For solid samples tracer shall be added after grinding, sieving, etc. but prior to any muffling or dissolution of the sample.
- The following are acceptable tracer isotopes:
U-232, Pu-242 or Pu-236, Am-243 or Cm-244, and Th-229 or Th-234

Action 6: If any of these items are non-compliant, re-analysis is required. If re-analysis is not performed or if re-analysis fails to correct any of the above mentioned deficiencies, qualify all applicable data as [J 242].

Item 7: Determine if the uranium, plutonium, americium and thorium target analytes are chemically separated from each other and from the rest of the sample matrix.

Action 7: If the target analytes are not chemically separated for samples and QC samples as determined from the spectral printouts, reject [R 247] all applicable data.

Item 8: Verify that the tracer recovery for U, Pu, and Am analyses is > 30% but < 110%. Use the following equation to calculate at least one tracer chemical recovery:

$$Y = \frac{DPM}{CV} = \frac{C_T}{T_S * EFF} * \frac{1}{CV}$$

where,

- DPM = observed disintegrations per minute of the tracer
CT = total counts in the tracer isotope ROI
TS = sample count time in minutes

EFF = detector efficiency
CV = certified value decayed to the date of analysis of the tracer aliquot in dpm

Action 8a: If the tracer recoveries have been calculated wrong, whether the parameters have been entered wrong or there has been a calculation error, issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Action 8b: If the tracers for samples and QC samples do not meet the required recoveries, professional judgment should be used to determine the effect this has on the data. At a minimum, estimate [J 242] all applicable data.

Item 9: Verify that all samples and QC samples in each analytical batch were spiked at the same appropriate tracer level, and were prepared concurrently and in the following manner:

- The standard material used to prepare the tracer solutions are valid (not expired) and traceable to NIST.
- The isotopic tracer aliquot has dpm values appropriate for the activity of the sample aliquot analyzed.
- The activity of the tracer aliquot for near background level samples for Pu and Am do not exceed 5 dpm, and for U, does not exceed 10 dpm for each isotope.

Action 9: If any of these items are non-compliant, estimate [J 242] all applicable data.

2.9. Standards Summary Raw Data

Review Items: Standard Summary Raw Data

Objective: To verify that all standards meet the requirements for documentation and traceability.

Sources: Attachment J to BOA Attachment I, GR03, § 6

Evaluation: *The following items apply to verification and validation:*

Item 1: Verify that the standard summary raw data is included in the in the SDP.

Action 1: If the standard summary is not included, issue a NCN, comment and assign reason code [801] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Evaluation: *The following items apply to validation only:*

Items 2: For primary or other standards (both diluted and undiluted) used for tracers, LCS and any in-house prepared instrument calibration sources, verify that the following information is reported as applicable:

- STANDARD ID. (Working Standard) that was used traced back to the PRIMARY STANDARD ID. (All identifiers must be traceable to

standard reference material certificates. Submit only the first page of the NIST certificate to establish primary standard ID. and/or traceability.

- STANDARD ISOTOPE, CONCENTRATION, AND ERROR IN THE WORKING STANDARD USED
- EXPIRATION DATE of Working Standard
- USE for this standard (tracer, LCS, efficiency, etc.)
- DATE OF PREPARATION
- SUFFICIENT DILUTION data to provide for calculation of the activity

Action 2a: Omissions or errors that do not have an impact on the assessor's ability to assess the data shall be documented with a comment and assigned the reason code [804]. An NCN shall be issued to prevent the recurrence of such errors or omissions in future data packages.

Action 2b: For other omissions or errors that impact the assessor's ability to complete the data review, issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Items 3: Verify a diluted primary standard and/or a secondary standard calculation.

Action 3: If these calculations do not coincide with the standard values, issue a Non-Compliance Notification and qualify all applicable data [R 243].

Items 4: Verify that all standard identifications are traceable to the primary certificate, which are traceable to NIST.

Action 4: If standards are not traceable to the primary certificate or are not traceable to NIST, issue a Non-Compliance Notification and reject [R 244] all applicable data.

Items 5: Verify that all standards and sources traceable to NIST have not expired and are valid.

Action 5: If standards and tracers have expired, reject [R 219] all applicable data.

2.10. Calibration Raw Data

Review Items: Calibration Raw Data

Objective: To verify the instrument calibration parameters are within control limits and to establish an analytical curve relating the response of an instrument to a quantifiable characteristic of the analyte in known standards.

Sources: Attachment J to BOA Attachment 1, GR03, § 6

Evaluation: *The following items apply to both verification and validation:*

Item 1: Verify the instrument calibration raw data contains raw data for the energy calibration, backgrounds and efficiency determinations.

Action 1: If any part of the instrument calibration raw data is missing, issue a NCN, comment and assign reason code [801] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Item 2: Verify the Data File Name for the instrument calibration applicable to sample analyzed in this data package is included in the Instrument Calibration Raw Data.

Action 2: If the Calibration Data File Name is not included in the Instrument Calibration Summary, contact the CTR for instructions. At a minimum, comment and assign reason code [804] to all data.

Evaluation: *The following items apply to validation only:*

Item 3: Verify the required following items are included for each alpha spectrometry detector used to report results:

Energy Calibration (required to be performed monthly)

- Instrument and Detector ID
- Date of the Energy Calibration
- Energy Calibration Isotopes
- Energy Versus Channels, "Calibration Curve Equation", including the slope and Y-intercept for linear equations and appropriate corresponding information for higher order equations if applicable

Action 3a: Omissions or errors that do not have an impact on the assessor's ability to assess the data shall be documented with a comment and assigned the reason code [804]. An NCN shall be issued to prevent the recurrence of errors or omissions.

Action 3b: For other omissions or errors that impact the assessor's ability to complete the data review, issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Item 4: Verify the required following items are included for each alpha spectrometry detector used to report results:

Backgrounds (required to be performed monthly)

- Instrument and Detector ID
- Date of the Background Analysis
- "Count Time"
- Respective "Start" and "End" "ROI" (in channels or energy)
- Respective ROI "Background Counts" or "Background" counts/unit time

Action 4a: Omissions or errors that do not have an impact on the assessor's ability to assess the data shall be documented with a comment and assigned the reason code [804]. An NCN shall be issued to prevent the recurrence of such errors or omissions in future data packages.

Action 4b: For other omissions or errors that impact the assessor's ability to complete the data review, issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Item 5: Verify the required following items are included for each alpha spectrometry detector used to report results:

Efficiency Calibrations

(Efficiency calibrations are required to be performed at least monthly, or sooner if the check source count is outside of the acceptance limits of the control chart, or when a new detector is put into service, or before an existing detector which has been repaired is put into service)

- Instrument and Detector ID
- Date of the Efficiency Analysis
- "Count Time"
- Efficiency Isotope
- Efficiency

Action 5a: Omissions or errors that do not have an impact on the assessor's ability to assess the data shall be documented with a comment and assigned the reason code [804]. An NCN shall be issued to prevent the recurrence of such errors or omissions in future data packages.

Action 5b: For other omissions or errors that impact the assessor's ability to complete the data review, issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Item 6: Verify all alpha spectrometry detectors were calibrated for the specific analytes of interest and each detector used for analysis of Site samples were calibrated on a monthly basis (at a minimum), or more frequently, if required.

Action 6: If the alpha spectrometry system was not calibrated at least monthly, issue a Non-Compliance Notification. Do not qualify any data. Comment and assign the reason code [129] to all applicable data.

Item 7: Verify that the order of performing the Instrument Calibration was (1) Energy Calibration, (2) Background determinations and (3) Detector Efficiency determinations.

Action 7: If the alpha spectrometry system was not calibrated in the above order, issue a Non-Compliance Notification. Do not qualify any data. Comment and assign the reason code [129] to all applicable data.

Item 8: Verify the energy calibration is with-in control limits according to the following:

Energy Calibration Control Limits

- The energy calibration for each detector shall be performed. A curve shall be fit for Energy (Y-axis) versus Channel (X-axis), and the equation with the slope and Y-intercept for the fit shall be documented.
- The slope of the equation shall be <15 keV/channel.
- The energy range of each detector shall include 3 to 6 MeV.
- The energy calibration shall be performed using NIST traceable calibration sources and at least three isotopes within the energy range of 3 to 6 MeV.
- The final peak centroid positions of all observed isotopes shall be within ± 40 keV of the expected peak centroid.

Action 8: If the alpha spectrometry system was not energy calibrated to meet the above requirements, issue a NCN. Do not qualify any data. Comment and assign the reason code [245] to all applicable data.

Item 9: Verify the background calibration is with-in control limits according to the following:

Background Control Limits

- The Background count time was documented and is as long as the sample count duration.
- The Background total counts (or counts per unit time) for each target analyte and tracer isotope ROI were analyzed on each detector and documented.
- The Background for each ROI was sufficiently low to optimize the MDA, so that the RDL can be achieved.
- The Background error and confidence level is documented.

Action 9: If the alpha spectrometry system was not background calibrated to meet the above requirements, issue a Non-Compliance Notification. Do not qualify any data. Comment and assign the reason code [246] to all applicable data.

Item 10: Verify the efficiency calibration is with-in control limits according to the following:

Efficiency Control Limits

- The Efficiency determinations were performed on each detector using NIST traceable calibration sources and the isotope used was either be ^{239}Pu , ^{240}Pu or ^{241}Am , and the isotopes had at least 10,000 counts in the region of interest.
- If the efficiency source was plutonium and the certified value of the source was based on the total alpha, the ROI used for the efficiency determination covered the range of 4 to 6 MeV to include decay daughters (in-growth of ^{241}Am).
- If the certified value for the Efficiency calibration source was determined for the specific isotope, the ROI used for the Efficiency determination was specific for that isotope.
- The Efficiency counts for the ROI were background corrected using the same ROI for the background.

- The Efficiency is determined on at least 2000 net counts in the ROI (after background correction).
- The resolution of the Efficiency isotope was <40 keV FWHM at >2000 net counts.
- The Efficiency error and confidence level was documented.

Action 10: If the alpha spectrometry system was not calibrated for efficiencies to meet the above requirements, issue a Non-Compliance Notification. Do not qualify any data. Comment and assign the reason code [177] to all applicable data.

2.11. Sample Analysis Raw Data

Review Items: Sample Analysis Raw Data

Objective: To verify sample raw data deliverable requirements have been met and that raw data are present in a form suitable for verification and validation. Verify that the instrument raw data is provided for all reported data and that the data is consistent with the results reported on the summary forms.

Sources: Attachment J to BOA Attachment 1, GR03, § 6

Evaluation: *The following items apply to both verification and validation:*

Item 1: Verify Sample Analysis raw data is present.

Action 1: If sample analysis raw data is missing, issue a NCN, comment and assign reason code [801] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Evaluation: *The following item applies to validation only:*

Item 2: Check that all instrument raw data for the RIN are included and are legible. Check that sample analysis raw data are included for all analyses performed and include the following:

- SAMPLE ID (Site / Laboratory)
- DATE AND TIME of analysis
- COUNT TIME
- DATA FILE NAME
- INSTRUMENT AND DETECTOR ID
- FILE NAME OF BACKGROUND USED
- APPROPRIATE DETECTOR BACKGROUND
- DETECTOR EFFICIENCY FOR THIS SAMPLE
- ANALYTICAL BATCH ID
- SAMPLE ALIQUOT SIZE
- ANALYTE ISOTOPE(S)
- START AND END CHANNELS FOR ALL APPLICABLE ROIS
- ANALYTE(S) GROSS COUNTS
- BACKGROUND COUNTS (IDENTIFY COUNT TIME OF BACKGROUND)

- ANALYTE(S) NET COUNTS
- FWHM AND PEAK ENERGY where applicable
- CHANNEL BY CHANNEL SPECTRAL PRINT-OUT that includes each ROI (including tracer) and an equivalent number of channels above and below the ROI
- INSTRUMENT RUN LOG for applicable count dates(copy is acceptable)

Determinations Using Tracer Isotopes

The following additional sample analysis raw data is required for determinations using tracer isotopes:

- TRACER ISOTOPE(S)
- START AND END CHANNELS FOR ALL APPLICABLE ROIS
- TRACER GROSS COUNTS
- BACKGROUND COUNTS (IDENTIFY COUNT TIME OF BACKGROUND)
- TRACER NET COUNTS
- FWHM AND PEAK ENERGY where applicable

Action 2a: Omissions or errors that do not have an impact on the assessor's ability to assess the data shall be documented with a comment and assigned the reason code [804]. An NCN shall be issued to prevent the recurrence of such errors or omissions in future data packages.

Action 2b: For other omissions or errors that impact the assessor's ability to complete the data review, issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Item 3: Verify that the individual spectra were reviewed, signed and dated by the alpha spectrometry specialist and found to be acceptable.

Action 3: If the spectra have not been reviewed and signed, issue a Non-Compliance Notification to request for missing information, comment and assign the reason code [804] to all applicable data.

Item 4: Verify that the tracer chemical recovery for U analyses is > 30% but < 110% and the tracer recovery for Pu and Am analyses are > 20% but < 110%.

Action 4: If the tracer recoveries do not meet the above criteria, reject [R 242] all applicable data.

Item 5: Verify the FWHM resolution for each sample and QC sample tracer peak are <100 keV and the tracer peak centroid is ± 50 keV of the expected energy check

Action 5: If the sample and tracer peaks do not meet the above requirement, estimate [NJ 242] all applicable data.

Item 6: Verify there is sufficient raw data included to allow manual calculation of the final sample activity, measurement uncertainty, and MDA.

Calculate at least one sample activity and its associated measurement uncertainty and confirm reported values.

Action 6: If there is insufficient raw data or reported values could not be confirmed, issue a NCN, comment and assign reason code [803] to all applicable data. Inspect all other SDP deliverables for missing information and incorporate any deficiencies into the NCN. Discontinue the data assessment until a new data package is received.

Item 7: Verify all QC samples were counted and analyzed in the same manner as the samples in the Analytical Batch, in the same time frame, and using the same instrument calibration parameters, and instrument analysis algorithms.

Action 7: If these items are non-compliant, do not qualify any data. Comment and assign the reason code [234] to all applicable data.

3. DATA QUALITY ASSESSMENT REPORT PREPARATION

Prepare a Data Quality Assessment Report according to the General Data Assessment guidelines presented in DA-GR01. A Data Quality Assessment Report template for DV-RC01 is presented as Attachment 1.

4. REFERENCES

- Guidance for Radiochemical Data Validation, Draft RD4, October 4, 1995, prepared by Office of Transportation, Emergency Management & Analytical Services (EM 26), Office of Compliance and Program Coordination, Environmental Management, U.S. Department of Energy.
- Reason Codes for Data Assessment, Analytical Services Document
- RFETS BOA Implementation Requirements, GR03 Version A.5
- RFETS BOA Implementation Requirements, GR04 Version A
- Basic Ordering Agreement (BOA) for Laboratory Analytical Services administered by Westinghouse Savannah River Company on behalf of the Department of Energy.

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ATTACHMENT 1: DATA QUALITY ASSESSMENT REPORT TEMPLATE

ASP

Data Quality Assessment Report Rocky Flats Environmental Technology Site

RIN Number	Analytical Method/Analytical Specific Line Item Code		Review Level
Analytical Laboratory	Assessment Performed by	Data Assessment Guideline Identifiers	Number of Samples

Sample Numbers: _____

Quality Control Items	Reviewed (Y or N)	Non-Compliance Identified
General (Cover Page, General SDP, Narrative)		
Chain of Custody, Preservation, and Holdings		
Sample Results		
QC Sample Results		
Duplicate Sample Results		
Laboratory Control Results		
Preparation Blank Results		
Preparation Raw Data		
Standards Summary Raw Data		
Calibration Raw Data		
Sample Analysis Raw Data		
Electronic Data Deliverable EDD		
Structural Requirements		
General Requirements		
Energy Calibration		
Backgrounds		
Efficiency Calibration		
Other:		

Y Item was reviewed or non-compliance was identified
N Item was not reviewed or non-compliance was not identified
N/A Item is not applicable to the Line Item

ASP
Data Quality Assessment Report
Rocky Flats Environmental Technology Site

Data Assessment results are classified as either Action Items or Comments. Action Items are technical non-compliances that result in qualification of analytical results. Data may be qualified as valid (V), estimated (J), presumptively estimated (NJ), estimated at an elevated level of detection (UJ), or rejected (R). Multiple qualifiers may be associated with any given data point based on the number of problems identified, however, the assigned qualifier is based upon the following hierarchy: R, UJ, NJ, J, V. All data points that are not qualified based upon action items in this report are considered valid (V). Comments are technical non-compliances or contractual non-compliances that do not result in qualification of data.

Action Items:

Comments:

Verification/Validation Signature_____

Date:_____

Reviewer Signature_____
(Validation Only)

Date:_____

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